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ABSTRACT

A literature review was undertaken to demonstrate how knowledge of one's cognitive processes, the orchestration of strategic effort, and the monitoring of one's cognitive activities can enhance reading performance. The findings indicate that while older readers exercise more awareness of their own learning processes and greater self-control or monitoring of performance, they may be deficient in other ways, such as in a lack of awareness of task and strategy variables. The review suggests that adult and college readers who show evidence of metacognitive deficiencies may be the most promising candidates for strategy training since they appear to be more aware of and capable of monitoring their mental processes while reading. (HOD)

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Metacognitive awareness and monitoring in adult and college readers

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Researchers in the fields of developmental cognitive psychology and reading have attempted to use the concepts under the label of metacognition to examine good and poor reader differences and the use of reading and learning strategies. Metacognition, in general, refers to both the knowledge (awareness) and the control (monitoring and correction) which a learner has over his own thinking and learning activities (Baker & Brown, 1980; Flavell, 1976; Paris, et al., 1982). Flexibility and efficiency are essential to this learner-control interaction (Brown, Campione, & Day, 1981; Moore, 1982). Although the majority of metacognitive research has been concerned with schoolage children, research has also provided us with important information about the college age and adult reader. The major purpose of this article is to review metacognitive studies of older readers and to draw conclusions and implications for strategy instruction. Additional findings from other reading ages will also be presented.

Metacognition is both old *and* new. Even in early 20th century considerations of "metacognition" (viz., Dewey, 1910; Thorndike, 1917), reading exemplified cognitive activities in which reasoning and flexibility were precursory to learning thinking efficiency. The essence of such early insight was that reading, like other cognitive activities, involved skills of self-awareness and self-control, which then lead to efficient reasoning. For example, Dewey's system of inducing reflective thinking was basically a call for metacognitive training. The aim was to induce active monitoring and critical reasoning, which would result in critical comprehension (Brown, 1982).

Metacognition and Reading

Baker (1982) defines metacognition as being composed of two overlapping components:

1. Awareness of what skills, strategies, and resources are needed to perform a task effectively; and
2. Ability to use self-regulatory mechanisms to ensure the successful completion of the task.

Many of the difficulties of the inefficient reader may be due to deficits in metacognition, as evidenced by a lack of awareness and control of the cognitive demands of a task. Baker and Brown (in press) found that metacognitive deficits among young children, learning disabled students, and poor readers have been evidenced in each of the following areas viewed as crucial to effective reading:

1. Understanding the purpose of reading;
2. Modifying reading strategies for different purposes;
3. Considering how new information relates to what is already known;
4. Evaluating text for clarity, completeness, and consistency;
5. Dealing with failure to understand;
6. Identifying the important information in a passage; and
7. Deciding how well the material has been understood.

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The ability to employ appropriate strategies and monitor their use is an important part of reading. The idea that students should play an active role in the selection of strategies and in monitoring their performance during reading has recently received increased attention (Brown, 1980). As illustrated in the above seven areas, the poor reader may be evidencing difficulty because of deficits in metacognition.

Although most researchers in this area are careful to emphasize that proficient reading is mostly automatic — and that monitoring is an automatic mechanism rendering the "clicks" of comprehension (Anderson, 1980, p. 497) — it is metacognitive awareness that guides effective selection and usage of activities for "debugging" (Brown, 1980). Thus metacognition in reading involves awareness of the reading process (Myers & Paris, 1978), how a reader monitors and regulates ongoing processes (Baker & Brown, 1980; Garner & Kraus, 1981-82), sensitivities to one's own abilities, and evaluation and correction strategies (Brown, 1982; Paris et al., 1982).

It is an individual's awareness of the cognitive process that enables modification of the process to suit a goal (Flavell, 1976). Lack of insight into the reading process and lack of metacognitive awareness may result in less ability to integrate learning variables. Although we are not absolutely sure what to attribute it to, good comprehenders seem flexible, more aware of what good comprehension entails (Golinkoff, 1975-76). Proficient readers are apparently better able to take control of their own comprehension and learning and regulate metacognitive variables. They are better able to know what they know and to monitor that awareness.

The major source of evidence that novice/poor readers have metacognitive deficits come from awareness and monitoring studies. Researchers have tapped the reader's awareness with interviews and questionnaires and have assessed the reader's monitoring of on-going comprehension with evaluation and regulation tasks.

Awareness

Younger and poor readers evidently are less aware that they must attempt to make sense of what they read. They seem to focus on decoding words rather than obtaining meaning from text (Moore & Kirby, 1981; Garner & Kraus, 1981-82). They differ in their awareness of strategies for getting meaning and in their regulation of strategies when they do experience difficulty (Canney & Winograd, 1979; Forrest & Waller, 1979). For example, Myers and Paris (1978), in an often cited study, investigated children's metacognitive knowledge of reading variables. They interviewed eight and twelve year old readers about their reading abilities, the parameters of reading tasks, and cognitive strategies used in reading. The variables were based on Flavell and Wellman's (1977) delineation of person, task, and strategy variables as the three major categories of metacognitive knowledge. The second graders in the study displayed less sensitivity to the semantic structure of paragraphs, goals of reading, and strategies for "debugging" than the older readers. The younger readers, like the second graders in Canney and Winograd's (1979) study, perceived in general that reading was "an orthographic-verbal translation problem rather than as a meaning construction and comprehension task" (p. 688).

In a recent study, based in part on the Myers and Paris (1978) investigation, Jacobs (1982) found that metacognitive knowledge and monitoring of reading improves with age. She found 5th graders more aware than third graders of purposes and functions of strategy in both monitoring and intervention. The poor readers demonstrated perfor-

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mance gains in comprehension from intervention based on their deficiencies.

Adult poor readers may also reveal a lack of metacognitive knowledge. Gambrell and Heathington (1981) used an interview design to tap good and poor readers' metacognitive differences in awareness of task and strategy variables. They questioned twenty-eight adult poor readers and twenty-eight adult good readers. The adult poor readers lacked sensitivity to both task and strategy dimensions of reading. They reported fewer strategies, had more misconceptions about such strategies, and were not as aware of how and when to use them. The poor readers had less understanding of textual elements. For example, only 43% of the poor readers were able to relate that a paragraph or story had some kind of order, while 96% of the good readers revealed their knowledge that a paragraph or story had structure. Only 21% of the poor readers gave a meaning-centered response when asked about the purpose of reading, in contrast to 79% of the good readers.

In this study, questions about knowledge of strategy variables were related to purposes for reading, reading mode, reading skills, and reading comprehension failures, much like the Myers and Paris (1978) questions. Gambrell and Heathington also asked questions related to motivation, structure of text, and prior knowledge. Following are a few examples of questions related to strategy variables:

If you're telling someone about something you've read, what do you try to tell them, all the word, just the ending or what?
Which would be easier to do, read word-for-word or for general meaning?
What makes someone a really good reader?
When you are reading, what do you do if you don't know a word?

Only 1/3 of the poor readers were able to give an answer to the last example above. In fact, the poor readers' knowledge of task and strategy variables, especially strategies, was much like the second graders in the Myers and Paris (1978) study. They seemed to perceive reading as a process of decoding rather than one of comprehending. Several misconceptions about the reading process were also evident. For example, 57% of the poor readers reported that it was easier to read word-for-word than for general meaning, a response much like the second graders. They also reported that reading aloud was more efficient than reading silently. They did not seem to be aware of independent, internally generated strategies. Such results demonstrate that adult disabled readers, too, may have a deficient understanding of the reading process.

Monitoring

Monitoring involves evaluation of one's comprehension success, regulation of the process, and self-correction when necessary (Baker & Brown, 1980). The majority of monitoring studies, as with awareness studies, have been concerned with elementary and secondary students. This research has revealed that young and/or novice readers are less able to monitor their understanding during reading and studying and to implement regulation and correction strategies when confronting comprehension problems.

Various measures have been utilized to identify the metacognitive differences existing among readers. Readers have been asked to rate the certainty of their response to a comprehension question. Older/better

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readers have been observed to be more successful than younger/poorer readers at rating such felt understanding (Forrest & Waller, 1979).

Several studies of self-corrections during oral reading have also revealed metacognitive differences among readers. Even the youngest good readers correct semantically inconsistent errors, but do not correct those that are semantically acceptable (Clay, 1973; Weber, 1970).

DiVesta, Hayward, and Orlando (1979) investigated metacognitive monitoring strategies by using a cloze technique. Their findings suggest that younger and poorer readers do not efficiently employ the strategy of using subsequent text for comprehension monitoring.

Another type of interview of questioning format for measuring metacognitive monitoring involves a reader's self-report during reading. From analyzing these reports, investigators have found strategy differences due to reading ability. For example, better readers across levels seem to adjust their reading behaviors according to task purposes (Hare & Smith, 1982; Smith, 1977).

Research indicated that readers differ by both age and ability in judging their own understanding (Brown, 1980; Markman, 1979; Steward & Tei, 1983). Using self-report techniques, Hare and Pulliam (1980) tested the hypothesis that college students' metacognitive behavior would predict their reading achievement scores. They asked students to introspect about their behavior as they read an expository article. Their data suggest that high scoring readers are more actively involved in reading. Collins, Brown, and Larkin (1980) gave their subjects five difficult texts and asked them to report the processing they used as they made sense of the passages. They found that skilled readers used a variety of strategies, such as evaluating for plausibility, completeness, and interconnectedness, in interpreting the text.

Readers who do not effectively monitor their understanding may fail to comprehend and make adjustments (Garner, 1980; Garner & Anderson, 1980). Researchers have asked if mature readers detect inconsistencies as they monitor text and what they do if comprehension fails. Baker (1979), for example, investigated comprehension monitoring in college age readers. The college students were to read and recall intentionally introduced confusions. Each passage contained one of three confusions: inappropriate, illogical connectives; ambiguous referrents; and inconsistent information. Subjects were not informed of the existence of the confusions before reading. Subsequent to answering recall questions, they were asked to reflect upon whether or not they noticed the confusions, how they interpreted them, and how the confusions affected their comprehension. Subjects did not detect 62% of the confusions. Additionally, less than 25% were noticed during the reading. The retrospections, however, indicate that many failures to report problems were due to fix-up strategies, rather than failure to monitor initial comprehension. For example, students reported that they often deliberately omitted or altered confusing information. They made inferences to resolve confusions, even without realizing that they had done so.

In a later study, Baker and Anderson (1982) asked college students to read expository passages containing either main point inconsistencies, detail inconsistencies, or no inconsistencies. The investigators found that the majority of college students monitored their understanding of reading passages as demonstrated by their modifications in processing strategies. Students spent more time on sentences containing information that they found to be inconsistent with information they already possessed and they looked back more often at the sentences that

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contained inconsistencies. Those students who did not identify the inconsistencies in the text may have failed to monitor their comprehension or may have constructed an explanation or interpretation of the text that satisfied their previous knowledge and experience.

Study monitoring is similar to comprehension monitoring. To be successful, students need to monitor their mental processes while studying (Locke, 1975). Metacognitive research has explored this study monitoring with college students.

A fruitful activity in this regard has been with summarization strategies. Brown, Campione, and Day (1981) point out that summarizing textual material may be a complex task requiring considerable skill. They have identified the following rules: delete redundancy, delete trivia, provide superordinates, select topic sentences, and invent topic sentences where missing. Brown and Day (1983) investigated summarization abilities of fifth grade, seventh grade, tenth grade, and college level students. Developmental differences apparently existed on the more complex rules. Invention was almost never used by fifth graders and by college students on only half of the appropriate occasions. The junior college students, who were remedial studiers, like the seventh graders, had great difficulty with the invention rule. This study indicates that while skilled students may successfully use summarization, remedial college students may find it difficult and improve with only the most explicit instruction.

Related to the ability to summarize textual content is the ability to identify the levels of importance of instruction in textual material. Brown and Smiley (1977) found seventh-grade to college age readers who were asked to study prose passages until they could remember the details, were generally able to select the most important idea units to use as cues for later retrieval. The college readers, however, exhibited the greatest degree of sensitivity to the relative importance of textual information. They shifted their attention to idea units of intermediate importance in a repeat trial on the same passage.

Self-questioning seems to be another effective strategy that sophisticated readers use as they process text. Research findings suggest that hypothesizing questions is a means for metacognitive monitoring (Andre & Anderson, 1978-1979), but that it may be a late developing strategy. Garner and Alexander (1982) found that only half of the college students they studied used the strategy. Moreover, they found that when the college students in their project did anticipate what questions might be asked about a passage they were reading, they significantly outperformed students who verbalized using other comprehension strategies. Self-questioning apparently serves to facilitate monitoring, regulation, and test readiness estimation as students interact with text. It seems that mature students possess sensitivities to textual idea relationships and implement interactive strategies such as summarization and self-questioning.

Conclusion

Metacognitive development differences appear to exist among all levels of readers but also among readers at all age levels. This review has supported the notion that metacognitive skills develop over time, that young children may be confused about the reading process, and may have trouble monitoring comprehension. High school students may demonstrate similar deficiencies. Adult and college readers usually monitor their comprehension but still may be deficient in some regards. They may lack awareness of some process, task, and strategy variables.

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They may also lack a sensitivity to the hierarchy of ideas found in text. Such insight may be essential for optimum processing. Furthermore, they may lack specific processing strategies, such as summarization.

In spite of the apparent strength of these findings, current controversy exists about the methodology used to measure metacognitive skills. Winograd and Johnston (1980), reviewing the error detection tasks discussed earlier, suggest that most readers are capable of exhibiting a wide range of metacognitive abilities and it is the subtlety of those abilities which may cause complications in accurate measurement. Additionally, a reader's performance might be affected by interactions between task demands and individual differences, such as affective factors (Erickson, Stahl, & Rinehart).

Despite the apparent shortcomings of awareness and monitoring studies, insights into metacognitive functioning have been gained. More expenditure of thought and effort is required as we consider the possibility of teaching the skills identified in awareness and monitoring studies to those who may qualify for direct instruction (Brown, in Golinkoff, 1975-76). The findings in regard to the adult reader offer encouragement and indicate the need for further research. Most of the research has been done with younger readers, yet the findings clearly indicate that adult and college readers may have metacognitive deficiencies. Furthermore, older readers as well as children have benefited from strategy instruction.

The general intent of this review has been to demonstrate how knowledge of one's cognitive processes, the orchestration of strategic effort, and the monitoring of one's cognitive activities can enhance reading performance. Findings indicate that older readers exercise more awareness of their own learning processes and greater self-control or monitoring of performance. However, results demonstrate that although adult and college readers monitor their comprehension, they may be deficient in other ways, such as in a lack of awareness of task and strategy variables.

Strategies can have been taught, maintained, and used to facilitate learning in a variety of settings (Day, 1980; Manzo, 1969; Paris, et al., 1982; Raphael, 1981; Smith & Alley, 1981). Adult and college readers who evidence metacognitive deficiencies may be the most promising candidates for strategy training since they appear to be more aware of and capable of monitoring their mental processes while reading.

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